

Full Text PA-96-002

THE HUMAN BRAIN PROJECT: PHASE I FEASIBILITY STUDIES

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National Aeronautics and Space Administration
Fogarty International Center
Department of Energy
National Institute on Alcohol Abuse and Alcoholism
National Heart, Lung, and Blood Institute
National Institute of Dental Research
National Institute of Neurological Disorders and Stroke
National Cancer Institute

PURPOSE

This Program Announcement (PA) replaces PA-93-068. The purpose of this initiative is to encourage and support investigator-initiated, neuroinformatics research that will lead to new digital tools for all domains of brain and behavioral research. The advanced information technologies resulting from this research are expected to be put to wide use by the brain and behavioral science community. Therefore, the approaches and technologies studied under the Human Brain Project will be generalizable, scalable, and extensible, and will use sophisticated, powerful computational resources.

HEALTHY PEOPLE 2000

The Public Health Service (PHS) is committed to achieving the health promotion and disease prevention objectives of "Healthy People 2000," a PHS-led national activity for setting priority areas. This PA, The Human Brain Project: Phase I Feasibility Studies, is related to the priority area of mental health and mental disorders. Potential applicants may obtain a copy of "Healthy People 2000" (Full Report: Stock No. 017-001-00474-0 or Summary Report: Stock No. 017-001-00473-1) through the Superintendent of Documents, Government Printing Office, Washington, DC 20402-9325 (telephone 202-512-1800).

ELIGIBILITY

Applications may be submitted by foreign and domestic, for-profit and non-profit organizations, public and private, such as universities, colleges, hospitals, laboratories, units of State and local governments, and eligible agencies of the Federal government. Foreign institutions are not eligible for exploratory center (P20) grants or First Independent Research Support and Transition (FIRST) (R29) awards. Racial/ethnic minority individuals, women, and persons

with disabilities are encouraged to apply as principal investigators.

MECHANISM OF SUPPORT

This program will use the research project grant (R01) and exploratory center grant (P20) mechanisms for supporting neuroinformatics research. In addition, the interactive research project grant (IRPG), which uses the R01 and R29 mechanisms, may be employed. Anticipated maximum annual budgets (direct and indirect costs) at time of award are \$230,000 for the R01 mechanism and \$1.1 million for the P20 mechanism. Support may be requested for a period of up to five years (foreign R01 grants are limited to three years duration). Because not all of the Federal organizations participating in this initiative support all of these mechanisms, it is important to contact program staff prior to preparing the application.

R01 Mechanism

The R01 mechanism will be used for research project grants, which will allow investigators to work on highly focused projects related to the integration of informatics research with brain and/or behavioral research. The R01 mechanism can be used for collaborative

research initiation grants that will be directed towards fostering the interactions of computer and mathematical scientists or engineers and brain and behavioral scientists to design and implement novel technological solutions to particular brain and behavior research problems. Applications may include requests for support of expenses for travel and per diem expenses to several laboratories to initiate or explore the possibility of setting up a collaboration. It is essential that the scientific questions to be pursued and the unique contribution of each potential group member should be explicitly stated.

IRPG R01 and R29 Mechanisms

The IRPG allows formal interactions between and among research efforts that are funded independently. Since each application is considered independently, each application must include both an informatics research component and a brain and/or behavioral research component. The IRPG encourages collaborative relationships that do not require extensive, shared, physical resources. A minimum of two independent investigators may submit concurrent, collaborative, cross-referenced individual R01 or R29 applications. The proposed projects must not be dependent on each other to the extent that one could not be accomplished in the absence of the other. Applications that comprise an IRPG group may be from one or more institutions. Applications will be reviewed independently for scientific merit. Applications judged to have significant and substantial scientific merit will be considered for funding both as independent awards and in the context of the proposed IRPG collaboration. Those interested in applying for an IRPG should consult Program Announcement PA-96-001, in this issue (Vol. 24, No. 35, October 6, 1995) of the NIH Guide.

P20 Mechanism

These awards provide the opportunity for several investigators using different approaches to focus on a common problem. P20 Exploratory Grants will facilitate coordinated communication across disciplinary and geographic boundaries. This exploratory mechanism is intended specifically to support interdisciplinary research and feasibility studies. Not all Federal organizations will provide primary support

for P20 grants. Therefore, prospective applicants should contact program staff (listed under INQUIRIES) prior to preparing an application for this mechanism.

Principal Investigator. Each P20 Exploratory Grant will have a Principal Investigator with a demonstrated ability to organize, administer, and direct the grant. The Principal Investigator must commit at least 25 percent effort to the grant and be Project Leader on one of the projects.

Focus of research. The P20 Exploratory Grants will combine and integrate informatics research and brain and/or behavioral research components in an effort to develop novel approaches and technologies for accomplishing the goals of the Human Brain Project.

P20 Exploratory Grants are characterized by the synergy of their constituent projects. Each such grant application must, therefore, not only demonstrate the interrelationship of its constituent projects, but also indicate how the inclusion of each project will enhance the overall goals of the grant.

Group members. Each P20 Exploratory Grant will be comprised of several laboratories, projects, and/or cores. It is expected that the Project Leaders of the constituent laboratories or projects will be regarded as leaders in their respective fields.

Information sharing. In research funded by this mechanism, digital and electronic communication, especially via computer networks, will be established among different laboratories, projects and cores within a given P20 Exploratory Grant group. With evidence of adequate electronic communication channels given in the application, laboratories, projects, and cores participating in a given P20 exploratory grant group need not all be at the same geographic location.

RESEARCH OBJECTIVES

Background

In 1989, the National Institute of Mental Health, the National Institute on Drug Abuse, and the National Science Foundation requested the Institute of Medicine to establish a Committee on a National Neural Circuitry Database. The Committee's charge was to consider the desirability, feasibility, and possible ways of implementing a family of resources, both electronic (e.g., computer networks) and digital (e.g., databases), for the enhancement of brain and behavioral research. After deliberations spanning almost 2 years and involving more than 150 scientific consultants, the Institute of Medicine endorsed the concept of mapping the brain and brain functions and issued several specific recommendations ("Mapping the Brain and Its Functions: Integrating Enabling Technologies into Neuroscience Research," 1991, Institute of Medicine, National Academy Press).

One recommendation is that this initiative should be implemented in several phases by the research community. Phase I will consist of research feasibility studies that researchers will refine and extend in Phase II. The tools resulting from this research and development will be made available to the scientific community at large in Phase III.

On April 2, 1993, the Human Brain Project was announced in Program Announcement (PA) PA-93-068, and published in the NIH Guide (Vol 22, No. 13, April 2, 1993). Subsequently, a Notice and Addendum were

published in the NIH Guide (August 27, 1993 and September 16, 1994, respectively). The research funded to date under the Human Brain Project has recently been assessed. This revised Program Announcement requests, on behalf of the participating Federal organizations, research grant applications for Phase I of the Human Brain Project in areas identified as high priority for this program. This program announcement supersedes the previous Program Announcement, Notice, and Addendum, and pertains only to Phase I activities.

Objectives and Goals

Brain and behavioral research produces data that are very diverse. This diversity includes the wide range of species (both natural and transgenic), from invertebrates to humans, from which data are obtained, as well as the levels of biological organization of interest, which span all levels, from molecules, to cells and systems of cells, to the level of behavior, and across the life span. Behavioral data encompass constructs as diverse as attention, perception, learning, memory, cognition, emotion, and language. In addition to their great diversity, brain and behavioral data are also vast. Such data are generated by tens of thousands of researchers working around the world, and these findings are reported in many hundreds of journals. Finally, this information is complex. There are innumerable interactions among different aspects studied in brain and behavioral research; for example, findings at the molecular level might have important implications for interpretation of behavioral data.

Keeping track of and integrating this information is beyond the scope of individual researchers. As investigators necessarily focus on more and more detailed aspects of brain structure and function, their scope of knowledge becomes more specialized and narrow. This, in turn, decreases the ability of scientists to make conceptual links across different areas of study although that ability is precisely the fuel that has driven much of the progress in the understanding of the brain and behavior. Approaches and technologies are needed to address this issue of information overload.

Informatics research, which draws from computer science, information science, applied mathematics, statistics, engineering, and related areas, can contribute to the development of solutions to the problem of keeping track of and integrating information about the brain and behavior. These solutions will be best achieved when brain and behavioral research are closely integrated with informatics research through scientific collaboration.

Scientific collaboration bridging brain and behavioral research and informatics research (i.e., neuroinformatics) promises to advance both fields. Neuroinformatics research will accelerate the understanding of the brain by providing the means to make better use and sense of data about the brain and behavior. These include novel database and querying approaches, data visualization and manipulation tools, and technologies for data synthesis and electronic collaboration. And, driven by the considerable demands made by the diversity, quantity, and complexity of data about the brain and behavior, neuroinformatics research will push informatics to expand the limits of knowledge in that field. Moreover, it is likely that solutions devised through neuroinformatics research will be generalizable to a wide range of scientific, and even broader, applications.

Program Description

The Human Brain Project is a broadly based Federal research initiative, sponsored, in a coordinated fashion, by sixteen Federal organizations from five Federal agencies: the National Institutes of Health (National Institute of Mental Health, National Institute on Drug Abuse, National Institute on Aging, National Institute on Child Health and Human Development, National Institute on Deafness and Other Communication Disorders, National Library of Medicine, the National Heart, Lung, and Blood Institute, the National Institute of Dental Research, the National Institute on Alcohol Abuse and Alcoholism, the Fogarty International Center, the National Institute of Neurological Disorders and Stroke, and the National Cancer Institute), the National Science Foundation, the Department of Defense (Office of Naval Research), the National Aeronautics and Space Administration, and the Department of Energy. Representatives from all of these organizations comprise the Federal Interagency Coordinating Committee on the Human Brain Project. In addition, the National Aeronautics and Space Administration (NASA) will make available to Human Brain Project research its supercomputer and other resources of the Biocomputation Center.

Phase I of the Human Brain Project supports research on advanced technologies and novel ways to acquire, store, retrieve, manage, analyze, visualize, manipulate, integrate, synthesize, disseminate and share data about the brain and behavior, including tools for electronic collaboration. The Human Brain Project supports investigator-initiated projects that include an informatics research component and a brain and/or behavioral research component, with these two components well integrated with each other. Projects that focus only on archival data are not appropriate for the Human Brain Project.

Since each application appropriate to the Human Brain Project includes both an informatics research component and a brain and/or behavioral science research component, it is expected that each application will have substantial involvement of informatics researchers as principal investigators, other key personnel, or as very active consultants. It is expected that the multidisciplinary research components will be well integrated with each other, and will be true scientific collaborations, rather than parallel efforts.

The research objectives that will have high priority are the following:

Informatics Research Component

- o Research on databases, querying approaches, and information retrieval The diversity of datatypes in brain and behavioral research will require databases that can accommodate varied data types (e.g., textual, graphic, image, time series), querying approaches that will allow varied databases to be accessed with a single query, and retrieval of different types of data into a common information space. In addition, databases, querying and retrieval tools will need to be extensible and easily reconfigurable to adjust to the rapidly changing domain of brain and behavioral research.
- o Research on data visualization and manipulation Data about the brain and behavior are extremely complex and highly interconnected. This high level of complexity requires novel ways to manipulate and visualize large, interconnected, datasets.
- o Research on data integration and synthesis As scientific specialization increases, integration and synthesis of different types of data and about different aspects of brain structure and function become increasingly difficult. Models can serve as

information spaces in which experimentally obtained data of different types and from different sources can be integrated and synthesized.

- o Tools for electronic collaboration. The ability to quickly assemble teams, independent of the geographic location, to address specific scientific questions would greatly accelerate the pace of discovery. Advanced forms of "groupware" with tools for data acquisition, display, and manipulation would facilitate this ability.

- o Research that builds bridges across existing information tools and resources. The tools and approaches developed through support from the Human Brain Project will be most useful if and when they work together and can access other databases and tools, such as those associated with the Human Genome Project and the Macromolecular Structure Database.

The informatics research component should be future-oriented and seek to exceed the current state-of-the-art.

Brain and/or Behavioral Research Component

- o Research that includes data and tools for data from biological levels of organization such as molecules, genes, cells, and systems of cells, and from behavioral constructs such as attention, perception, learning, memory, cognition, emotion, and language. Research that integrates across these levels and constructs is strongly encouraged.

- o Research that includes structure-function relationships This is needed at all levels of organization, from the level of the cell to the level of behavior.

Human Brain Project research is expected to lead to advanced information technologies and approaches that will probably not be fully implemented for five to ten years after this Phase I research is started. In addition, the tools developed from this research will likely serve the entire brain and behavioral research community. In order to meet the long term nature and breadth of this initiative, research projects with following characteristics are sought:

- o Generalizable. For example, algorithms for quantifying differences in three dimensional reconstructions of data obtained from electron microscopy should generalize to volume data from confocal microscopy and magnetic resonance imaging of whole brains.

- o Sophisticated research performed on sophisticated platforms. The Human Brain Project is a long term initiative to support research and development of advanced information technologies. Computers that are sophisticated by current standards are likely to be widely available in five or ten years. Today's low-end machines are likely to be obsolete by the time the tools now being researched are made available to the scientific community at large.

- o Extensible and scalable. Phase I research efforts will lead to tools and approaches intended for the scientific community at large, rather than an individual laboratory. In order to achieve this goal, it is important that issues of scalability and extensibility are addressed from the outset.

- o Designed to assess progress. Since research and development is ultimately intended to be of use not only to an individual laboratory, but to a wide range of laboratories, it is important that methods to assess progress towards achieving the objectives of the Human Brain Project: Phase I are addressed. This includes the

development and documentation of standards by which tools will be tested for reliability and accuracy.

Although each project supported by the Human Brain Project Phase I will have an informatics research component as well as a brain and/or behavioral research component, this initiative will provide support for an informatics research component to be carried out with ongoing, already funded, peer-reviewed brain and/or behavioral research. In this case, funding for the brain and/or behavioral research may come from any peer-reviewed source. If other support is not ongoing, support will also be provided for both the informatics and the brain and/or behavioral components.

Each project will report the attainment of proposed specific aims through progress reports and the timely publication and dissemination of results, including aspects such as software, database designs, and source codes.

It is expected that researchers funded by different grants under the Human Brain Project will communicate; coordination and collaboration across different Human Brain Project grants is strongly encouraged. Supplemental funds may be competitively awarded to projects to support such interactions. A listing of investigators participating in Phase I and the types of data, software, or other information that is available from or through them will be shared among all grantees to minimize scientifically unnecessary duplication of effort in Phase I. Grantees are expected to participate in Annual Spring Meetings of Human Brain Project Agencies and Researchers. These meetings will promote communication among different groups of investigators, and will be held in the Washington, D.C. area.

Grantees will be encouraged to perfect copyright protection of software produced as a result of Human Brain Project funding. These should include prominent notification in the software and its documentation that the software is copyrighted. Notification could consist of the following:

Copyright c [year] by [your name, the names of you and your colleagues, or the name of your institution] with funding from the Human Brain Project.

This notification will identify the source of the software and help ensure that the software can be shared freely while protecting any commercial rights in it. In addition, grantees will be required to agree that they will provide the primary funding organization, upon its request and at a reasonable cost, a copy of any software produced under Human Brain Project funding, with the understanding that the Federal organizations directly involved with the Human Brain Project will have the right to use such software for internal research and archival purposes only and will not permit its distribution beyond those organizations.

Application components related to ethical, legal, and social issues pertinent to this initiative are encouraged. Also encouraged are components of applications that are designed to reach out to the public, academic, and/or commercial sectors and educate and inform about the opportunities that are presented by research and development of neuroinformatics.

Availability of Computational Resources

The choice of computational resources to be used in Human Brain Project research is entirely that of the applicant, and the range of appropriate resources extends across the entire spectrum of computer

technology. Nevertheless, some investigators may be interested in using, or collaborating with those using, supercomputers, massively parallel computers, and other advanced technology that may not be available at their institution. To facilitate such use and collaboration, the following information is provided.

The NSF supports High Performance Computer Centers and Science and Technology Centers. Individuals considering applications for supercomputer use should contact these centers early in the application development process.

Cornell Theory Center
Linda Callahan
514 Engineering and Theory Center Building
Ithaca, NY 14853-3801
Telephone: (607) 254-8610
Email: cal@theory.tc.cornell.edu

National Center for Atmospheric Research,
Scientific Computing Division
Visitor/User Information
P.O. Box 3000
Boulder, CO 80307
Telephone: (303) 497-1225
Email: scdinfo@ncar.ucar.edu

National Center for Supercomputing Applications
Scott Lathrop
605 East Springfield Avenue
Champaign, IL 61820-5518
Telephone: (217) 244-1099
Email: slathrop@ncsa.uiuc.edu

Pittsburgh Supercomputing Center
Robert B. Stock
4400 Fifth Avenue
Pittsburgh, PA 15213
Telephone: (412) 268-4960
Email: stock@psc.edu

San Diego Supercomputer Center
Mark Sheddon
P.O. Box 85608
San Diego, CA 92186-9784
Telephone: (619) 534-5130
Email: sheddon@sdsc.edu

The ONR also supports a variety of supercomputer facilities. Those interested in these resources for Human Brain Project Research should contact the ONR contact listed at the end of this announcement early in the process of application development.

In addition, NASA will make available computational resources of the Biocomputation Center (BC) at Ames Research Center, Moffett Field, California. These resources include computer-controlled transmission electron microscopy for semiautomated 3 dimensional reconstruction of neural tissue, virtual environments, high-performance workstations, supercomputers, and massively parallel computers.

A scientist interested in using the BC as part of Human Brain Project research must submit a written request for facility use to the BC Director prior to submitting an application to the Public Health Service. This request must state the objectives of the intended work and the approaches to be used. This request must also provide enough

information to allow BC staff to assess whether or not the intended use is within the capability of the BC. In addition, this request must provide information necessary to allow BC staff to determine the amount of time the proposed work will require.

The BC staff will provide the requesting scientist an itemized estimate of the costs for BC resources needed to achieve the stated objectives. The scientist will use this estimate as part of the budget justification in the Public Health Service application for funds to support the Human Brain Project research.

Requests for BC use are to be sent to:

Dr. Muriel Ross
Director
Biocomputation Center
MS 261-2
Ames Research Center
Moffett Field, CA 94035-1000

INCLUSION OF WOMEN AND MINORITIES IN RESEARCH INVOLVING HUMAN SUBJECTS

It is the policy of the NIH that women and members of minority groups and their subpopulations must be included in all NIH supported biomedical and behavioral research projects involving human subjects, unless a clear and compelling rationale and justification is provided that inclusion is inappropriate with respect to the health of the subjects or the purpose of the research. This new policy results from the NIH Revitalization Act of 1993 (Section 492B of Public Law 103-43) and supersedes and strengthens the previous policies (Concerning the Inclusion of Women in Study Populations, and Concerning the Inclusion of Minorities in Study Populations), which have been in effect since 1990. The new policy contains some provisions that are substantially different from the 1990 policies.

All investigators proposing research involving human subjects should read the "NIH Guidelines For Inclusion of Women and Minorities as Subjects in Clinical Research," which have been published in the Federal Register of March 28, 1994 (FR 59 14508-14513) and reprinted in the NIH Guide for Grants and Contracts, Volume 23, Number 11, March 18, 1994.

Investigators also may obtain copies of the policy from the program staff listed under INQUIRIES. Program staff may also provide additional relevant information concerning the policy.

APPLICATION PROCEDURES

Applications are to be submitted on the grant application form PHS 398 (rev. 5/95) and will be accepted at the application deadlines as indicated below. Application kits are available at most institutional offices of sponsored research and may be obtained from the Office of Grants Information, Division of Research Grants, National Institutes of Health, 6701 Rockledge Drive, Room 3034 - MSC 7762, Bethesda, MD 20892-7762, telephone 301/435-0714, email: girg@drupo.drg.nih.gov. The title and number of the program announcement, "PA-96-002 THE HUMAN BRAIN PROJECT: PHASE I", must be typed in Section 2 on the face page of the application. Before preparing an IRPG application, applicants should obtain the revised PA (PA-96-001, NIH Guide Vol 24, No. 35, October 6, 1995), which includes "Special Instructions."

Each application must clearly articulate the manner in which the

informatics research components relate to, and are integrated with, the brain and/or behavioral research component(s). Because Phase I of the Human Brain Project supports feasibility studies, each application must describe specific mechanisms proposed to evaluate the success of the research in terms of feasibility.

R01 and R29 Mechanisms: For the R01 and R29 mechanisms, applicants must follow the instructions provided in grant application form PHS 398 (rev. 5/95). Funds to support travel to the two day Annual Spring Meeting of Human Brain Project Agencies and Researchers should be included in the budget for the principal investigator and up to one additional key member of the research team.

Applications for the FIRST award (R29) must include at least three sealed letters of reference attached to the face page of the original application. FIRST award (R29) applications submitted without the required number of reference letters will be considered incomplete and will be returned without review.

P20 Mechanism: The application must describe the specific research hypotheses to be tested and how they relate to the overall research issue to be addressed. In applications for the P20 mechanism, funds to support travel to the two day Annual Spring Meeting of Human Brain Project Agencies and Researchers should be included in the budget for the principal investigator (the director of the grant), the director of each subproject and core, and up to one additional key member from the P20 research team.

For the P20 Exploratory Grant applications only, the Research Plan Section of PHS Form 398 (Specific Aims, Background and Significance, Progress Report/Preliminary Studies, and Research Design and Methods) should be replaced by the following.

General Description of the Overall Project (Not to exceed 10 pages)

The applicant must provide an overview of the proposed project and its central theme and goals, describe the general objectives, and explain the proposed contribution of each of the individual projects and cores in achieving these objectives. Furthermore, the administrative arrangements and support necessary to effect the research should be carefully described in the application. In particular, when more than one institutional site is involved, a detailed description and supporting documentation for the administrative arrangements must be included. Detailed information on collaborations, recruitment, facilities, and resources must also be provided.

Cores (Not to exceed 5 pages for any one core) The applicant must describe how each core will contribute to the goals of the overall project as well as how each individual project will draw upon a particular core. The description of each core should clearly indicate the facilities, resources, services and professional skills that the facility will provide.

Individual Projects (Not to exceed 15 pages for any one project) The applicant must describe the major objectives and goals of each individual project and its relationship to the effort of the entire group of constituent projects. In addition, detailed descriptions should be provided on the following:

Research Plan: The questions to be addressed and the hypotheses to be tested by the proposed research should be highly focused and fully explained. Full discussion is required on the status of current research efforts, the limitations of existing approaches, and how the

research questions posed relate to the objectives of the Human Brain Project. In addition, the relationship between the brain and/or behavioral research component and the informatics research component components should be made explicit, as should the novelty of the informatics research component.

Experimental Plan: The description of the experimental design should provide the specific strategies proposed to accomplish the specific aims of the project and should include a discussion of the innovative aspects of the approach. Nevertheless, the experimental procedures need not be spelled out in great detail if those procedures have already been extensively published and accepted by the scientific community. New methodology and its advantage over existing methodologies should, however, be fully described. Furthermore, the feasibility of the proposed experiments, the potential pitfalls, alternative approaches, means of assessing success of research to meet the objectives of the Human Brain Project Phase I, and relevance to the goals of the project as a whole should be fully discussed. The methods to be used should be cited and referenced.

Operational Plan: A description of the resources and working arrangements required to implement the research plan should be fully elaborated. If a project includes a clinical component, attention should be devoted to a description of the clinical populations and tissue resources. A distinction must be made between those resources that are already in place (including staff) and those resources that must be added to carry out the proposed research.

Applications for P20 grant mechanisms will not be accepted from organizations outside of the United States.

Application Submission

The signed original and three legible copies of the completed application should be sent to:

DIVISION OF RESEARCH GRANTS
NATIONAL INSTITUTES OF HEALTH
6701 ROCKLEDGE DRIVE, ROOM 1040 - MSC 7710
BETHESDA, MD 20892-7710
BETHESDA, MD 20817 (for courier/overnight mail service)

At time of submission, two additional copies of the application must also be sent under separate cover to:

Michael F. Huerta, Ph.D.
National Institute of Mental Health
5600 Fishers Lane, Room 11-103
Rockville, MD 20857
Telephone: (301) 443-5625
FAX: (301) 443-1731
Email: MHUERTA@HELIX.NIH.GOV

It is important to send these copies at the same time that the original and three copies are sent to DRG; otherwise, it cannot be guaranteed that the applications will be reviewed in competition with other applications received in response to this Program Announcement.

It is recommended that applicants contact the appropriate program official(s) listed under INQUIRIES and submit a letter of intent. The letter should include a descriptive title of the proposed research, the name, address, and telephone number of the Principal Investigator, names of other key personnel, and participating institutions.

Although a letter of intent is not required, is not binding, and does not enter into the review of subsequent applications, the information that it contains is helpful in planning for the review of applications. The letter should be submitted to Dr. Michael F. Huerta at the address listed under INQUIRIES. Each letter of intent will be distributed to all of the sponsoring agencies, institutes and center.

The next receipt date and review cycles for Phase I Human Brain Project applications are as follows:

Application Receipt Date:	January 16, 1996
Administrative Review:	January 1996
Scientific Review:	February/March
Advisory Council Review:	May/June
Earliest Starting Date:	July

Dates for submission and resubmission of Phase I Human Brain Project applications and review cycles for subsequent years, starting with July 1996 due date for letter of intent, are as follows:

Letter of Intent Receipt Date:	July 1
Application Receipt Date:	October 15
Administrative Review:	October
Scientific Review:	February/March
Advisory Council Review:	May/June
Earliest Starting Date:	July

It should be noted that there is no additional receipt date for revised applications or for competitive continuations (i.e., renewals). All applications, initial submissions, revised, and competitive continuations will be received only once a year.

REVIEW CONSIDERATIONS

Applications will be assigned to the appropriate agencies, institutes and center according to their goals and designs and in accordance with standard referral guidelines. Applications that are complete will be evaluated for scientific and technical merit by an appropriate peer review group convened by one of the Federal organizations sponsoring the Human Brain Project. As part of the initial merit review, all applications will receive a written critique and undergo a process in which only those applications deemed to have the highest scientific merit, generally the top half of applications under review, will be discussed, and assigned a priority score. Subsequent processing of the application will follow the procedures of the respective agency, institute and/or center to which it has been assigned. For applications assigned to a Public Health Service (PHS) institute or center, the application will receive further review by the appropriate National Advisory Council. All successful projects will be identified as "A Unit of the NIH/NSF/ONR/NASA Human Brain Project."

Review Criteria

- o Scientific, technical, or medical significance and originality of proposed research. In the context of this PA, significance is exemplified by work that will lead to significant integration of novel informatics research and brain and/or behavioral research, to new discoveries, and to new technological developments.
- o Appropriateness and adequacy of the experimental approach and methodology proposed to carry out the research.

- o Qualifications and research experience of the Principal Investigator and staff, particularly but not exclusively in the area of the proposed research.
- o Availability of resources necessary to perform the research.
- o Appropriateness of the proposed budget and duration in relation to the proposed research.
- o Feasibility and adequacy of the organizational and administrative plans.
- o Adequacy of plans to include both genders and minorities and their subgroups as appropriate for the scientific goals of the research when human subjects are used. Plans for the recruitment and retention of subjects will also be evaluated.

The initial review group will also examine the provisions for the protection of human and animal subjects, the safety of the research environment, and conformance with the NIH Guidelines for the Inclusion of Women and Minorities as Subjects in Clinical Research.

AWARD CRITERIA

- o The relevance of the proposed research to the mission of the Human Brain Project and the areas of high priority for Phase I research
- o Scientific merit of the proposed research
- o Availability of research funds and competing demands of other research funding requirements

Annual awards will be made subject to continued availability of funds and progress achieved. A competing supplemental application may be submitted during an approved period of support to expand the scope of a project during the approved period. A competing continuation (i.e., renewal) application may be submitted before the end of an approved period of support to continue a project.

INQUIRIES

Inquiries are encouraged. The opportunity to clarify any issues or questions from potential applicants is welcome. The following representatives from each of the participating agencies, institutes and center can be contacted for further information or clarification. Potential applicants are strongly encouraged to contact the agency or institute representative to discuss their plans prior to preparing an application.

Michael F. Huerta, Ph.D.
 National Institute of Mental Health
 5600 Fishers Lane, Room 11-103
 Rockville, MD 20857
 Telephone: (301) 443-5625
 FAX: (301) 443-1731
 Email: MHUERTA@HELIX.NIH.GOV

Terry Allard, Ph.D.
 Office of Naval Research
 Department of the Navy
 800 N. Quincy Street, Room 823, Code 342-CS
 Arlington, VA 22217-5660
 Telephone: (703) 696-4502

FAX: (703) 696-1212
Email: TERRY@TOMCAT.ONR.NAVY.MIL

Patricia Bryant, Ph.D.
National Institute on Dental Research
45 Center Drive, Room 4AN-24K
Bethesda, MD 20892-6402
Telephone: (301) 594-2095
FAX: (301) 480-8318
Email: bryantp@de45.nidr.nih.gov

Jack C. Chow, M.D.
Fogarty International Center
Building 31C, Room B2C11
9000 Rockville Pike
Bethesda, MD 20892
Telephone: (301) 496-5903
FAX: (301) 480-3414
Email: jchow@helix.nih.gov

Deborah Claman, Ph.D.
National Institute on Aging
Gateway Building, Room 3C307
7201 Wisconsin Avenue
Bethesda, MD 20892
Telephone: (301) 496-9350
FAX: (301) 496-1494
Email: CLAMAND@GW.NIA.NIH.GOV

Peter A. Clepper
National Library of Medicine
Building 38A, Room 5S518
8600 Rockville Pike
Bethesda, MD 20894
Telephone: (301) 496-4221
FAX: (301) 402-0421
Email: CLEPPER@NLM.NIH.GOV

Dean Cole, Ph.D.
Office of Health and Environmental Research
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The National Eye Institute (NEI), while not cosponsors of this Program Announcement, has continuing interest in the scientific areas related to the Human Brain Project. NEI will continue to fund research on these topics through applications received through the regular receipt and referral processes of the Division of Research Grants. Applicants should contact the relevant NEI program staff for further information.

AUTHORITY AND REGULATIONS

This program is described in the Catalogue of Federal Domestic Assistance Nos. 93.242 (NIMH), 93.279 (NIDA), 47.074 (NSF), 93.866 (NIA), 93.865 (NICHD), 93.173 (NIDCD), 93.371 (NCRR), 93.879 (NLM) and 12.300 (ONR). Awards are made under authorization of the Public Health Service Act, Title IV, Part A (Public Law 78-410, as amended by Public Law 99-158, 42 USC 241 and 285) and administered under PHS grants policies and Federal regulations 42 CFR 52 and 45 CFR part 74. This program is not subject to the intergovernmental review requirements of Executive Order 12372 as implemented through Department of Health and Human Services regulations at 45 CFR part 100 or Health Systems Agency Review. Awards by PHS agencies will be administered under PHS grants policy as stated in the Public Health Service Grants Policy Statement (April 1, 1994).

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